IT IS CLAIMED:

1. A method of treating an atherosclerotic target region of a coronary vessel in a patient, comprising

delivering to the patient, a photoatherolytic compound, to cause accumulation of the compound in the target region,

accessing the target region intraluminally with a guidewire,

advancing over the guidewire, a catheter having (i) a proximal main-body sleeve, (ii) a flexible, non-inflatable, translucent distal-end sleeve joined to the main-body sleeve at a catheter juncture, and (iii) an inner lumen extending through the two sleeves, said advancing being effective to position the catheter's distal-end sleeve within the target region,

removing the guidewire from the catheter,

introducing through the catheter, a fiber-optic bundle having a light-diffusing tip, until said tip is positioned adjacent the catheter juncture,

injecting a light-transmissive fluid through the catheter into the catheter's distal-end sleeve, and

irradiating the atherosclerotic vessel region by passing a laser light beam through the fiber optic bundle,

wherein said beam is distributed along the catheter's distal-end sleeve, for transmission through the sleeve, by light scattering produced by at least one of said light-diffusing tip, (ii) the light-transmissive fluid in the catheter's distal-end sleeve and (iii) the distal sleeve itself, and the scattered light transmitted through the sleeve is effective to photoactivate the photoatherolytic compound contained in the target region.

2. The method of claim 1, wherein the photoatherolytic compound is selected from the group consisting of a phycocyanin, a phthalocynanine, pheophorbide derivative PH-1126, mono-L-aspartyl chlorin e6 (NPe6), hematoporhyrin derivative (HpD), benzoporphyrin derivative (BPD), Photofrin and Photofrin 2, protoporphyrin IX, and dihematoporphyrin-ester and -ether (DHE).

3. The method of claim 1, wherein said injecting includes forcing a transparent or translucent aqueous solution through the catheter lumen.

4. The method of claim 1, wherein said irradiating is carried out for a total of between about 10-20 minutes.

5. The method of claim 4, wherein the catheter has a catheter wall port distal to said juncture, said port is positioned downstream of the target region in the coronary vessel, when the catheter is fully advanced, and said method further includes, at one or more intervals during said irradiating step, retracting the catheter to position said port upstream the target, and thereby allow blood in said vessel to flow into and through said distal end region, to promote blood flow through the target region of the vessel at intervals during the treatment procedure.

6. Apparatus for use in treating an atherosclerotic target region of a coronary vessel in a patient, comprising

a guidewire for accessing the target region intraluminally,

a catheter having (i) a proximal main-body sleeve, (ii) a flexible, non-inflatable, translucent distal-end sleeve joined to the main-body sleeve at a catheter juncture, and (iii) an inner lumen extending through the two sleeves, through which lumen the catheter can be advanced over the guidewire, with such positioned in the target region, to place the catheter's distal-end sleeve within the target region,

a fiber-optic bundle having a light-diffusing tip, said bundle being adapted to be introduced through the catheter lumen, with the catheter's distal-end sleeve placed within the target site,

a proximal-end catheter port through which a light-transmissive fluid can be injected through the catheter into the catheter's distal-end sleeve, and

an proximal-end optical connector through which the fiber-optic bundle can be connected to a laser source, for irradiating the atherosclerotic vessel region by passing a laser light beam through the fiber optic bundle,

such that the laser beam is distributed along the catheter's distal-end sleeve, for transmission through the sleeve, by light scattering produced by at

least one of (i) said light-diffusing tip, (ii) light-transmissive fluid injected into the catheter's distal-end sleeve and (iii) the distal sleeve itself, and where the scattered light transmitted through the sleeve is effective to photoactivate the photoatherolytic compound contained in the vessel region.

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7. The apparatus of claim 6, wherein said catheter has an inner-lumen diameter of between about .45 and .6 mm.

8. The apparatus of claim 6, wherein the optic fiber bundle is formed of a plurality of light fibers encased in an outer sleeve for relative axial fiber sliding movement, to enhance the flexibility of the fiber bundle.

9. The apparatus of claim 6, wherein said catheter has a wall port downstream of said juncture, and located to allow blood in the patient's vessel to flow into and through said distal end sleeve, with the catheter distal-end sleeve placed in the target region, and withdrawn to place the port just upstream of the target region.